



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/625,493	07/25/2000	Morio Gaku	2000-1033A	6721

7590 02/23/2005

Wenderoth Lind & Ponack LLP
2033 K Street N W Suite 800
Washington, DC 20006

EXAMINER

PIERCE, JEREMY R

ART UNIT	PAPER NUMBER
----------	--------------

1771

DATE MAILED: 02/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/625,493

Applicant(s)

GAKU ET AL.

Examiner

Jeremy R. Pierce

Art Unit

1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on December 3, 2004 has been entered. Claim 1 has been amended. Claims 1-5 are currently pending. The amendment is sufficient to overcome the 35 USC 112 rejections set forth in section 4 of the last Office Action.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al. (U.S. Patent No. 5,368,921) in view of Sakaguchi et al. (EP 768,814), Touzaki (JP 11-77892), and Kawakita et al. (U.S. Patent No. 5,817,404).

Ishii et al. provide a metal foil-clad laminate obtained by lamination molding a resin-impregnated substrate and a metal foil (column 2, lines 22-24). The resin is dissolved in a solvent (column 4, line 50). The substrate can be a woven glass fabric with a preferred thickness of 0.05 to 0.2 millimeters (column 2, lines 57-66), but Ishii et al. do not teach the basis weight of the glass fabric. Sakaguchi et al. disclose that a woven glass cloth for circuit boards may be used that has a basis weight of only 15 to 30 grams per square meter (Abstract). Sakaguchi et al. teach a method of providing

Art Unit: 1771

such lightweight glass without sacrificing strength properties (page 2, lines 47-55). It would have been obvious to a person having ordinary skill in the art at the time of the invention to use a glass fabric weighing between 15 and 30 grams per square meter in the circuit board of Ishii et al. in order to provide a lightweight material, as taught by Sakaguchi et al.

Ishii et al. also do not teach the gas permeability of the glass fabric. Touzaki teaches the permeability of glass fabrics for making a copper-clad laminate is preferably 1-15 cc/cm²/sec to obtain a laminate where air bubbles aren't present and the resin constituent sufficiently sinks into the glass fabric (Paragraph 10). It would have been obvious to one having ordinary skill in the art to use a glass fabric with a permeability between 1-15 cc/cm²/sec in the laminate of Ishii et al. in order to have the resin sufficiently sink into the prepreg without forming air bubbles, as taught by Touzaki.

Finally, although all of the above references are directed to printed circuit boards, none of the references teach making a small diameter hole in the material with a carbon dioxide gas laser. Kawakita et al. teach that higher performance is achieved in printed circuit boards by making inner-through-hole connections (column 1, lines 10-31). Kawakita et al. also teach that small-diameter, i.e. 0.15 mm, holes are made by using a carbon dioxide laser (column 10, lines 45-51). It would have been obvious to a person having ordinary skill in the art at the time of the invention to make small diameter holes in the composite of Ishii et al. in order to improve performance of the circuit board, as taught by Kawakita et al.

Art Unit: 1771

With regard to claim 2, Ishii et al. teach the thermosetting resin is blended with inorganic filler in the amount of from 10 to 45% by weight based on the total amount of the resin solid or from 5 to 30% by weight of the substrate (column 4, lines 6-19). With regard to claim 3, Ishii et al. disclose the prepreg to have 55% weight of resin solid and inorganic filler in his examples (column 5, line 7). Therefore, the glass content of the prepreg must be 45% by weight, which falls within the Applicant's claimed range of 25 to 70% by weight. With regard to claim 4, with the disclosed substrate thickness of 0.05 to 0.2 millimeters disclosed (column 2, lines 57-66), the thickness of the copper-clad laminate would inherently fall into the Applicant's claimed range of 0.03 to 0.15 millimeter upon typical impregnation of the resin and when typical copper foil is clad on the outside of it. With regard to claim 5, Ishii et al. disclose using a cyanate ester resin as the thermosetting resin used to impregnate the substrate (column 3, lines 16-18).

Response to Arguments

4. Applicant's arguments filed December 3, 2004 have been fully considered but they are not persuasive.
5. Applicant argues that Sakaguchi et al. and Ishii et al. have no recognition of the importance of gas permeability in the present invention. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck &*

Art Unit: 1771

Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, Touzaki was used to disclose the claimed permeability limitation.

6. Applicant argues that gas permeability is 78-250 cc/cm²/sec according to glass woven fabrics defined in IPC 4412. However, Touzaki teach providing a woven glass fabric with permeability falling within Applicant's claimed range. Reasonable motivation for using the permeability disclosed by Touzaki has been provided in the rejection.

7. Applicant argues that even if Touzaki is combined with Ishii et al., it is impossible for a person skilled in the art to consider that the hole-making processability with a carbon dioxide laser can be improved. However, the motivation for combining the Ishii et al. and Touzaki references need not be the same as Applicant's motivations in creating the same properties. So long as a reasonable basis is provided for motivating a person of ordinary skill in the art to combine elements already known in the prior art, the obviousness rejection is valid. The motivation, as set forth above, is to have the resin sufficiently sink into the prepreg without forming air bubbles, as taught by Touzaki.

8. Applicant argues that Kawakita et al. teach away from using a glass woven fabric. However, the question is not whether it would be obvious to use the laminate of Ishii et al. in the invention of Kawakita et al. The question is whether it would be obvious to use the process of making small diameter holes taught by Kawakita et al. in the invention of Ishii et al. In general, Kawakita et al. teach that through holes formed in resin impregnated substrate create improved performance in printed circuit boards (column 1, lines 10-31), and then disclose the diameter of the hole to be 0.15 mm (column 10, line 50). Nothing in Kawakita et al. suggests that these size holes cannot

Art Unit: 1771

be achieved in other types of substrates. As Applicant points out, Kawakita et al. uses nonwoven synthetic substrates (column 3, lines 11-19). However, Kawakita et al. do not disclose these types of substrates are necessary in order to form holes with a laser. In fact, Kawakita et al. disclose that through holes can be formed in glass epoxy laminates (column 11, lines 24-25). So there is reason to believe that through holes may be formed in the Ishii et al. laminate.

9. Applicant argues that the base material of Kawakita et al. is different from that of the claimed invention, and that Kawakita et al. fail to disclose the thickness, weight, and permeability of the claimed invention. However, Kawakita et al. is not used to show any of these features in the rejection. Kawakita et al. is only used to teach that it would be obvious to a person having ordinary skill in the art to provide through holes in the laminate taught by Ishii et al. Ishii et al., Sakaguchi et al., and Touzaki, in combination, teach Applicant's claimed substrate and properties.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

Art Unit: 1771

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeremy R. Pierce whose telephone number is (571) 272-1479. The examiner can normally be reached on Monday-Thursday 7-4:30 and alternate Fridays 7-4.

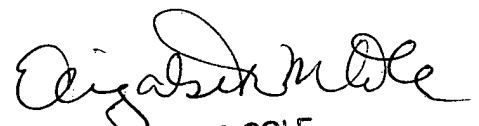
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JRP

JRP

February 10, 2005


ELIZABETH M. COLE
PRIMARY EXAMINER